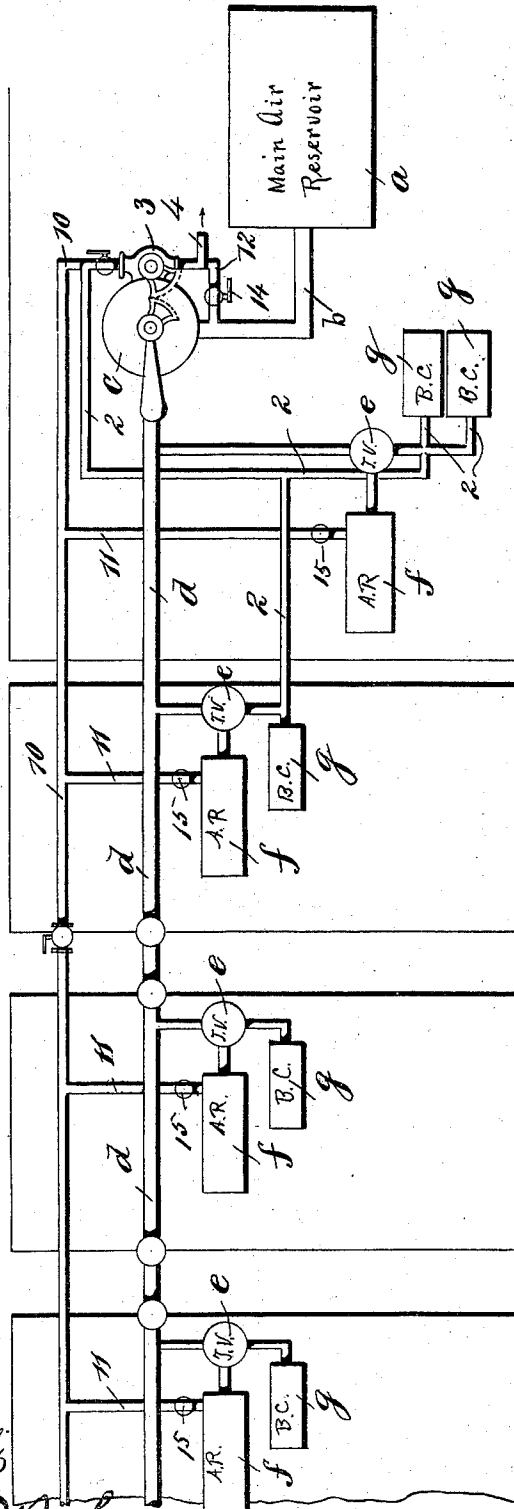


S. L. FRENCH.
AIR BRAKE.

No. 533,286.

Patented Jan. 29, 1895.

Fig. 1.



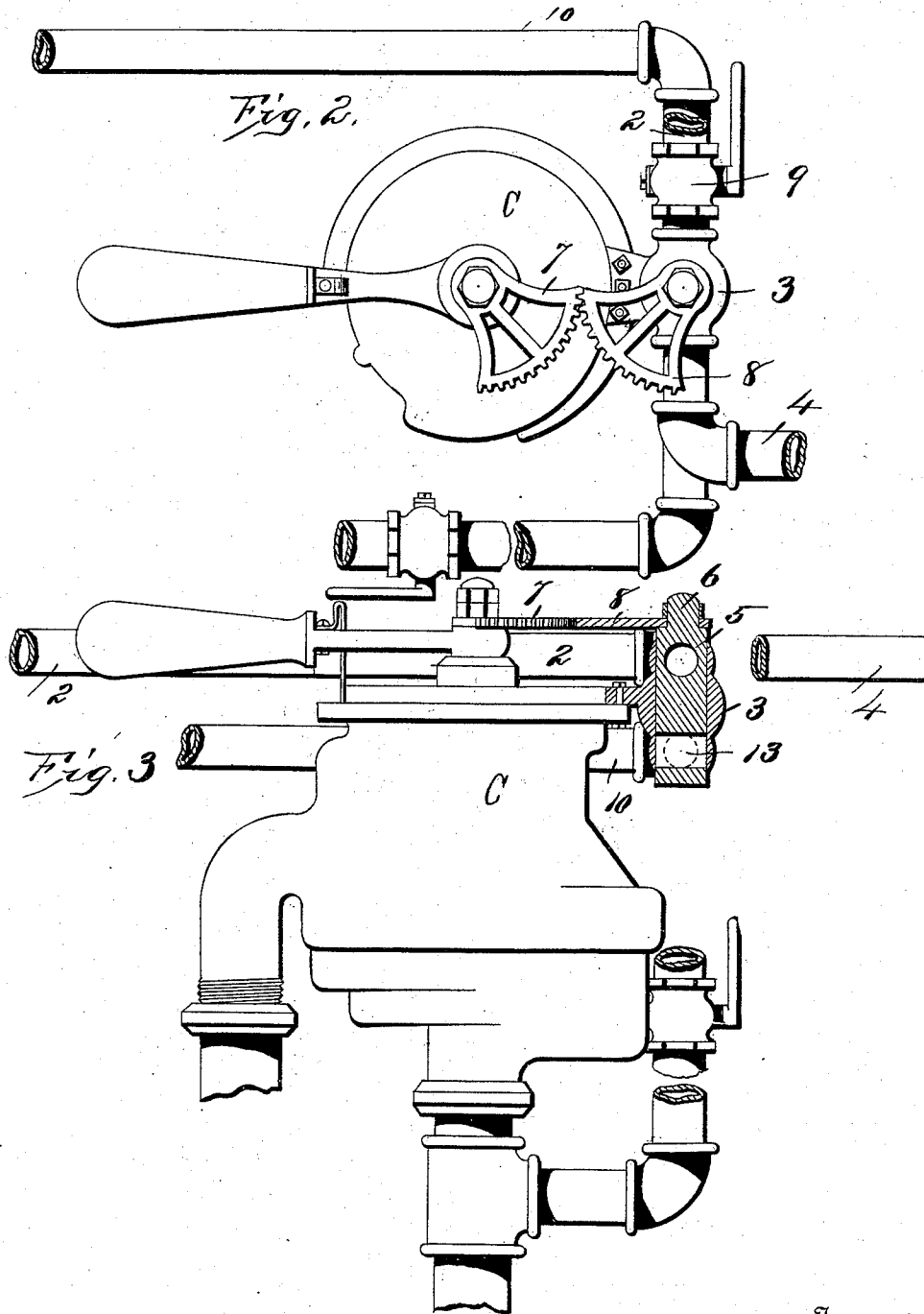
Witnesses
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UNITED STATES PATENT OFFICE.

SAMUEL L. FRENCH, OF LIGONIER, ASSIGNOR OF ONE-HALF TO HULBERT S. HARRINGTON AND WILLIAM S. HEAD, JR., OF LATROBE, PENNSYLVANIA.

AIR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 533,286, dated January 29, 1895.

Application filed April 3, 1894. Serial No. 506,181. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL L. FRENCH, of Ligonier, in the county of Westmoreland and State of Pennsylvania, have invented certain new and useful Improvements in Air-Brakes; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and numerals of reference marked thereon, which form part of this specification.

This invention relates to certain improvements in air brakes.

The object of the invention is to provide improved means, whereby the engineer can automatically release the air or other fluid pressure from the brake cylinders direct, without passing through, and independent of the triple valves.

A further object of the invention is to provide an air brake system with connections between the main air reservoir and the auxiliary reservoirs, controlled by a valve so that when the engineer throws his valve to apply the brakes the main reservoir will be automatically placed in communication with the auxiliary reservoirs so as to maintain the pressure therein.

The invention consists in certain novel features of construction and in combinations of parts more fully and particularly described hereinafter and pointed out in the claims.

Referring to the accompanying drawings: Figure 1, is a diagrammatical view showing the present invention applied to use in connection with an ordinary air brake system. The diagram is intended to illustrate the working parts carried by the engine and tender and two cars. Fig. 2, is a detail plan view showing the engineer's valve and the supplemental valve actuated thereby and portions of the connections, the valve being shown in released positions. Fig. 3, is a detail side elevation of the engineer's valve showing portions of the connections, and the auxiliary valves in vertical longitudinal sections.

In the drawings the reference letter *a*, indicates the main reservoir carried by the loco-

motive and having the usual connection *b*, to the engineer's controlling valve *c*.

d, is the usual train pipe extending from the engineer's valve beneath the tender and cars as usual.

e, is the triple valve suitably connected with the train pipe, a triple valve being provided for the locomotive and tender and each car as usual.

The auxiliary reservoirs *f*, are suitable connected with the triple valves; and the brake cylinders *g*, are also connected to the triple valves in a suitable manner.

The ordinary air brake system in general use has thus far been described, and the operation is as usual. A suitable pressure is maintained in the train pipes, auxiliary reservoirs and the main reservoir. When the engineer throws his valve to the stop position a suitable quantity of air is allowed to escape from the train pipes, the connections to the main reservoir being closed by the same movement, thus reducing the pressure in the train pipes, causing the triple valves to automatically move by reason of the excessive pressure in the auxiliary reservoirs so as to shut off connections between the auxiliary reservoirs and the train pipe, and to open connections from the auxiliary reservoirs to the brake cylinders thereby applying the brakes.

To release the brakes the engineer throws his valve to the position shown in Figs. 1 and 2, thereby throwing the pressure from the main reservoir into the train pipes which operation automatically causes the triple valves to shut off the connections between the auxiliary reservoirs and the brake cylinders, and places the auxiliary reservoirs in communication with the train pipe, and discharges the pressure from the brake cylinders to the outer air. In practice this ordinary air brake system has been found to be defective in certain respects.

When the engine and tender are used in switching cars it has been found that under certain conditions the brakes on the engine and tender cannot be released quick enough for certain purposes. To avoid this difficulty and enable the brakes of the engine and ten-

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der to be immediately and instantaneously released whenever desired, the connections 2, from the brake cylinders *g*, of the engine and tender, opening directly into the same independent of the triple valves, are carried to any suitable valve 3. The case of this valve 3, can be secured to the casing of the engineer's valve *c*. The pipe 2, opens through this casing and is adapted to register with the port or passage 5, through the plug valve 6, in said casing 3, so that the pipe 2, can be opened to and closed from the discharge 4, to the outer air by said plug valve. This plug valve can be operated in any suitable manner from the engineer's valve. I here show the stem of the engineer's valve provided with the toothed segment 7, meshing with the toothed segment 8, rigid with the stem of the plug valve so that when the engineer's valve is thrown to release, the plug valve will be also moved, so as to place the connections 2, and the brake cylinders in communication with the outer air thereby permitting the pressure in the brake cylinders to be discharged instantaneously and at once.

The cut off valve 9, is located in the connection 2, at a convenient point in the engineer's cab so that said connection 2, can be closed when it is not desired to open the brake cylinders to the outer air every time the engineer's valve is thrown to release.

Considerable difficulty has been experienced with the ordinary air brake systems when running trains on long down grades because of the rapid consumption of the air pressure, it often being necessary to let the train get beyond control or to "run away" before sufficient pressure could be again restored with sufficient rapidity in the auxiliary reservoirs. To obviate this effect an auxiliary train pipe 10, is provided running beneath the cars of the train and provided with suitable couplings and directly connected by branches 11, with all of the auxiliary reservoirs. The connections are made directly from this auxiliary pipe 10, to the auxiliary reservoirs independent of the triple valves and main train pipe *d*. This pipe 10, is directly connected with the main air reservoir through the medium of the valve 6, and side connection 12, to the connection *b*, between the engineer's valve and the main reservoir. In order to control the pressure through the pipe 10, the plug 6, is extended downwardly and provided with a duct 13, arranged to register with the pipes 10, and 12, opening through the casing 3, of the valves so that the connections between said pipes 10, and 12, can be cut off by said valve 6.

The duct 13, preferably extends through the plug 6, in a plane at right angles to the duct 5, so that when the pipes 2 and 4, are in communication and the brakes are being released communication between the pipe 10, and the main air reservoir will be cut off as clearly shown in Fig. 3.

When the engineer's valve is thrown to the

stop position (the position opposite to that shown in Figs. 1 and 2) communication through the pipes 2 and 4, will be shut off and the valve will open communication from the main air reservoir through pipes *b*, and 12, and through the valve to the pipe 10, and all of the auxiliary reservoirs so that a plentiful pressure is provided in the auxiliary reservoirs to apply the brakes.

A cut off 14, can be located in the pipe 12, to cut off connection between the main reservoir and the pipe 10, when it is not necessary to employ this direct connection for maintaining sufficient pressure in the auxiliary reservoirs.

15, are check valves in the branches 11, to permit the air to flow from the pipe 10, into the auxiliary reservoirs, but prevent back flow. Hence the air is held in said reservoirs to apply the brakes if the train pipes break or the train breaks.

The invention can be easily applied to an ordinary air brake system and at a very slight expense.

I do not wish to limit myself to the peculiar valve 6, or to the employment of such a double valve.

It is evident that various changes might be made in the forms, arrangements and constructions of the parts described without departing from the spirit and scope of my invention. Hence I do not wish to limit myself to the exact construction herein set forth, but consider myself entitled to all such changes as fall within the spirit and scope of my invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. An air brake system having direct discharge connections from one or more of the brake cylinders independent of the ordinary working parts of the system operated by the engineer's valve, a separate valve controlling the same, arranged adjacent to the engineer's valve, and connected with and operated by the same to open said connections, to discharge the air from said cylinder or cylinders, when the engineer's valve is thrown to the release position.

2. An air brake system having the discharge connection from the brake cylinders of the tender and engine, a controlling valve for said connection secured to the engineer's valve and having its stem connected with and operated by the engineer's valve, and a cut off in said connection between said controlling valve and the cylinders.

3. An air brake system for a locomotive and its tender controlled by the engineer's valve and provided with direct and independent discharge connections from the brake cylinders having a controlling valve operated by the engineer's valve and arranged in relation thereto so that when the engineer's valve is thrown to release said controlling valve will open the discharge connection and the

air will be exhausted from the brake cylinders through the triple valves and through said direct exhaust, substantially as described.

4. An air brake system comprising the main
5 air reservoir, the engineer's valve, the train
pipe, the triple valves, the auxiliary reser-
voirs, the brake cylinders, an auxiliary train
pipe directly connected with the auxiliary
reservoirs and with the main air reservoir,
10 and provided with the separate controlling
valve connected with and operated by the
engineer's valve and arranged in relation
thereto so that when the engineer's valve is
thrown to stop, air can be supplied to the aux-
15 iliary reservoirs through said auxiliary pipe.

5. An air brake system having connections
from one or more of the brake cylinders to
the outer air, a connection from the main air
reservoir to the auxiliary reservoirs, a single
20 plug valve controlling said two connections
with and operated by the engineer's valve and
constructed so that when the engineer's valve
is thrown to release, the direct connection to
the auxiliary reservoir will be cut off and the
25 direct discharge from the brake cylinders will
be opened, and when the engineer's valve is
thrown to stop, the discharge from the brake

cylinders will be closed and direct communi-
cation opened from the main air reservoir to
the auxiliary reservoirs.

6. An air brake system having a direct
30 shunt connection from the main air supply
to the auxiliary reservoirs around the engi-
neer's valve, triple valves and train pipe, and
having a controlling valve arranged beside
35 the engineer's valve and coupled thereto so as
to operate therewith as set forth, and a shut
off valve between said controlling valve and
the reservoir to throw said shunt connection
into and out of working condition, substan-
40 tially as set forth.

7. The engineer's valve having a valve cas-
ing secured to the exterior thereof provided
with a plug valve therein, and the meshing
gears on the stem of the engineer's valve and
45 on said plug valve, substantially as described.

In testimony that I claim the foregoing as
my own I affix my signature in presence of
two witnesses.

SAMUEL L. FRENCH.

Witnesses:

ROBERT M. GRAHAM,
GEO. R. TAYLOR.